

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, line 10-12, it is unclear as to how the second extraction unit could extract a signal with high-pass characteristics in the inputted signal if the first extraction unit only extracts (i) the signal with low-pass characteristics and (ii) the signal with band-pass characteristics. In line 16, the term "said sampling frequency" lacks clear antecedent basis, and it appears that such term should be changed to "said predetermined sampling frequency" if it refers to the same term used in line 15. In lines 20-21, it is not clear if the cut off frequency is the cut off frequency for the signal with low-pass characteristics or the signal with band-pass characteristics because it is understood that the cut off frequency of each of these two signals must be different. Because of this reference where the cut off frequency is "in the vicinity" of the reproducible frequency of a speaker, it is further confusing, as stated in lines 25-27, how the signal with high-pass characteristics can be extracted by the second extraction unit whose frequency is equal to the reproduction frequency if such reproduction frequency is the cut off frequency of the signal with low-pass characteristics or of the signal with

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band-pass characteristics. Thus, the term “the vicinity”, as used in line 21, is vague as to what it actually means or refers to.

Regarding claim 2, the term “a filter” seems to refer to the filter mentioned in claim 1; therefore, it should be changed to “the filter” to avoid possible confusion that another filter is being referred to. Applicant is asked to adopt similar approach for the terms in all the claims, for example: the term “a speaker” (in lines 27-28 of claim 1 referring to “a speaker” first used in lines 21-22), the term “a speaker” (in line 2 of claim 4).

Regarding claim 4, the term “said sampling frequency” lacks clear antecedent basis.

Regarding claims 5-13, these claims recite similar language as compared to claim 1; thus, they are raised with the same issues as the rejected claim 1 above.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 4, 5, 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanaka et al (U.S. Patent 4,295,006; hereinafter referred to as Tanaka).

Regarding claims 1, 5, Tanaka discloses a filter circuit (Fig. 5) comprising an input unit (1), a first extraction unit and second extraction unit (8, 10, 12). Tanaka further discloses in Fig. 2A, a switched-capacitor equivalent circuit.

Regarding claim 4, Tanaka further discloses that the frequency is dependent of the size of the speaker enclosure (col. 4, lines 34-51).

Regarding claim 12, Tanaka further shows the amplification unit (14, 16, 18) and speaker (T, S, W inside enclosure 26).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3, 5, 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murata et al (JP 08-293750; hereinafter referred to as Murata) in view of Kwan et al (U.S. Patent 5,495,200; hereinafter referred to as Kwan).

Regarding claims 1, 5, and 12, Murata discloses a filter circuit (Fig. 1) comprising an input unit (7), first extraction unit and second extraction unit (HPF 1 and LPF 2), where the frequency cut off is equal to or higher than the reproducible frequency of the speaker (9) as the speaker would be able to output. Murata fails to teach that the first extraction unit is comprised of a switched capacitor equivalent circuit. However, Kwan

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teaches a switched-capacitor equivalent circuit (Fig. 2). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the switched-capacitor equivalent circuit as taught by Kwan into the filter circuit of Murata's because of its compatibility with integrated circuit processing (col. 1, lines 37-39).

Regarding claims 2 and 13, Kwan further discloses that the filter is a biquad filter (col. 2, lines 12-13).

Regarding claim 3, Kwan further discloses that the biquad filter (Fig. 2) comprises first stage (20), second stage (22) and third stage (24) where each stage includes a switched-capacitor equivalent circuit and an operation amplifier.

Regarding claims 10-11, even though Kwan discloses that his biquad filter is of the third order, not the first and second order high-pass filters as claimed, the Examiner takes Official Notice that these first and second order filters are very well-known in the art. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to replace the third order filter as taught by the combined filter of Murata and Kwan's because of its known design and availability.

Regarding claim 2, Kwan further discloses that the filter is a biquad filter (col. 2, lines 12-13).

7. Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murata in view of Kwan as applied to claims 1-3, 5, 10-13 above, and further in view of Tan (U.S. Patent 6,011,770).

Regarding claims 6-7, the combined filter of Murata and Kwan's fails to teach the control unit for controlling the frequency of the first extraction unit. However, utilizing the control unit for controlling the frequency of the filter is known in the art as suggested by Tan (Fig. 6, 161, and col. 6, lines 18-22). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to implement the control unit as taught by Tan into the combined filter of Murata and Kwan's so that the cut off frequency of the first extraction unit can be controlled to the desired frequency.

Regarding claims 8-9, even though Tan does not specifically mention that the instruction on the frequency received is converted into a digital data word. However, the Examiner takes Official Notice that such conversion of received signal into digital data word is well-known in the art. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform such conversion so that proper signal format can be obtained to be processed by combined filtering circuit.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murata in view of Kwan as applied to claims 1-3, 5, 10-13 above, and further in view of Tanaka et al (U.S. Patent 4,295,006).

The combined filter circuit of Murata and Kwan's fails to teach that the reproducible frequency of the speaker is determined according to the enclosure volume of the speaker. However, Tanaka teaches that the frequency of the filter is dependent on the size of the speaker enclosure (col. 4, lines 34-51). Therefore, it would have been

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obvious to a person of ordinary skill in the art at the time the invention was made to utilize the teaching of Tanaka's into the combined filter circuit of Murata and Kwan's because this would allow the cut off frequency to be raised when the enclosure of the speaker becomes smaller; thus, improving the signal to be properly controlled to improve sound output.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Phan whose telephone number is (571) 272-6338. The examiner can normally be reached on Monday-Friday (9:00AM-5:30PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz can be reached on 571-272-7499. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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